



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,409	11/24/2003	Feng Chen	CS 03-039	5057

30402 7590 04/13/2007  
WILLIAM STOFFEL  
PMB 455  
1735 MARKET ST. - STE. A  
PHILADELPHIA, PA 19103-7502

EXAMINER
----------

SHAKERI, HADI

ART UNIT	PAPER NUMBER
----------	--------------

3723

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/13/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/720,409

Applicant(s)

CHEN ET AL.

Examiner

Hadi Shakeri

Art Unit

3723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 37-61 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 37-61 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____                                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____   | 6) <input type="checkbox"/> Other: ____                           |

**DETAILED ACTION*****Continued Examination Under 37 CFR 1.114***

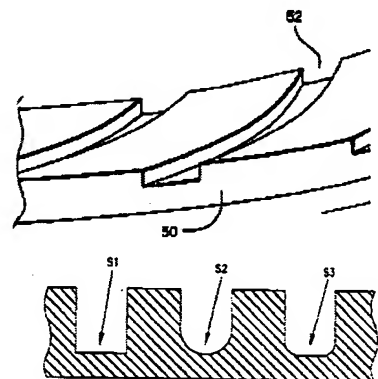
1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 24, 2007 has been entered.

***Claim Rejections - 35 USC § 103***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 37-42, 44-46, 49-52, 54-57, 59 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. in view of Chen et al. (6,656,019).

Lai et al. meets all of the limitations of the above claims, i.e., a CMP retaining ring having inner and outer peripheral surfaces and a lower surface comprising a plurality of grooves each of which continuously extends entirely across the lower surface from the inner surface towards the outer surface; the plurality of grooves includes at least a first groove and a second



groove, except for disclosing at least a portion of the first groove not adjacent to the lower surface having a rounded cross-section contour along the length of the groove. Chen et al. teaches grooves for delivering slurry of varying shapes. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the invention of Lai et al.

Art Unit: 3723

with different shapes, e.g., S3 as taught by Chen et al. to avoid accumulation of debris (Chen et al. 10:08-13).

Regarding claims 38-42, 44, 46, 51, 52, 54, 56, 57, 59 and 60, Lai et al. as modified meets the limitations, e.g., linear grooves; radius of about 6.5 mm. Regarding curved and slanted sidewalls, Lai et al. as modified by Chen et al., meets all the limitations, and suggests that the grooves may be of any shaped situated for the particular application, and it is also noted that, it has been held that changing shape, dependent on work-piece parameters, involves only routine skill in the art. *In re Stevens*, 101 US PQ 284(CCPA1954), and further it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the sidewall curved to enhance prevention of accumulation, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

4. Claims 43, 47, 48, 53, 58 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. modified by Chen et al as applied to claims 37, 50 and 55 above, further in view of Taylor (6,869,335).

Lai et al. as modified by Chen et al. meets all of the limitations of the above claims, except for disclosing a rounded top corner (corners contacting the pad).

Taylor teaches that the corners of the grooves contacting the pad can be beveled or rounded. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the invention Lai et al. with rounded top corners as taught by Taylor to avoid excessive wear of the pad (Taylor 05:32-34).

#### ***Response to Arguments***

5. Applicant's arguments filed February 24, 2007 have been fully considered but they are not persuasive.

The arguments against the teaching reference, Taylor, that it is a weak reference, that it can only be done with hindsight, and that Lai teaches away from the combination, are not persuasive. The motivation to modify Lai in view of Taylor is explicitly suggested in the 3 lines by the teaching reference, i.e., to reduce pad wear. With regards to Taylor teaching away from such combination, it is noted that Lai discloses providing outward stretching by employing serrated surface as shown for the embodiment of Figs. 9 and 10 only or fillet 98 for the backside of the groove as embodied in Figs. 7 and 8, or impart stretching action by virtue of tension imparted to the upper surface of the pad by arcuate grooved features as shown in Fig. 5, which is in no way teaching against the other embodiments, e.g., as shown in Fig. 8A, that is if extending the life of the ring is desired, hard wearing backside surface 94 may be employed. In fact it discloses that any surface characteristic configurations may be combined with others to fit the individual application. Furthermore Lai discloses that the edge fillet may be arcuate or convex and/or concave as desired, which to one of ordinary skill in the art may suggest rounded corners. In this case if prolonging the life of the polishing pad is desired, rounded top corners may be employed as suggested by the teaching reference, which would not reduce grip as argued by the applicant since the imparting tension and subsequent stretching action is accomplished by arcuate grooved surface.

In response to applicant's arguments against the references, i.e., Chen and Lai individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case Chen teaches improved shapes for grooves in delivering slurry to avoid accumulation of debris, clearly applicable to the grooves for a retaining ring, configured for the same purpose, i.e., delivery of slurry.

The arguments against the teaching reference, Chen, that it does not disclose a retaining ring, only grooves in the polishing pad and that rounded corners may prevent slurry accumulation in the pad but that it cannot be applied to a retaining ring are not persuasive. It appears that Applicant is arguing that a reference must disclose all of the limitations of the claim, or it cannot be applicable. The Examiner agrees with the Applicant that Chen only discloses the improved grooves for a polishing pad as disclosed in Fig. 14 of Chen, and that Chen does not disclose applying such grooves to a retaining ring, but it suggests that in order to prevent accumulation of slurry in a groove, the corners may be rounded. This is a clear suggestion under the obviousness rejections for one of ordinary skill in the art, otherwise if Chen suggested or disclosed such grooves in a ring; it would have been applied under anticipation rejection. In this case the references are in the same field of endeavor, i.e., CMP processes and are pertinent to the particular problem with which the applicant was concerned, i.e., improvement in the slurry delivery.

### ***Conclusion***

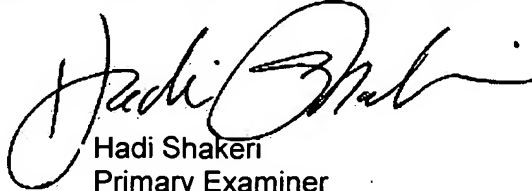
6. Prior art made of record and not relied upon at this time are considered pertinent to applicant's disclosure. Donohue is cited to show related invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hadi Shakeri whose telephone number is 571-272-4495. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph J. Hail, III can be reached on 571-272-4485. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3723

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Hadi Shakeri", is written over the printed name.

Hadi Shakeri  
Primary Examiner  
Art Unit 3723

September 11, 2006